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(21) International Application Number: PCT/FI00/00351 (22) International Filing Date: 20 April 2000 (20.04.00) (30) Priority Data: 990911 22 April 1999 (22.04.99) FI (71) Applicant (for all designated States except US): HELSINGIN PUHELIN OYJ - HELSINGFORS TELEFON ABP [FI/FI]; Korkeavuorenkatu 35-37, FIN-00130 Helsinki (FI). (72) Inventors; and (75) Inventors/Applicants (for US only): FILS, Henry [FI/FI]; Gyldenintie 4 A 4, FIN-00200 Helsinki (FI). LEHIKONEN, Timo [FI/FI]; Mäkelänkatu 4 a A 11, FIN-00510 Helsinki (FI). (74) Agent: SEPPO LAINE OY; Itämerenkatu 3 B, FIN-00180 Helsinki (FI).		(81) Designated States: AE, AG, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), DM, DZ, EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments. In English translation (filed in Finnish).	
(54) Title: METHOD AND SYSTEM FOR CALL REDIRECTION			
(57) Abstract			
<p>The invention relates to a method and system for redirecting a call, e.g., in conjunction with a call rerouting, in which method calls are established at least partially over a public switched telephone network (1, 6, 16, 12) using the signaling protocol of the public switched telephone network. According to the invention, during the ongoing call, signaling information (14) is received at and send from the terminal (2, 11) over a communications path separate from that serving the actual telephone connection using a signaling protocol which is different from that used for call management in a public switched telephone network, whereby the signaling which is different from that used for call management in a public switched telephone network is converted into a normal telephone call control signaling and then is sent to the means of the public switched telephone network for the purpose of controlling the ongoing call.</p>			
<pre> graph TD 1[1] -- 8 --> 9[9] 1 --> 2[2] 1 --> 6[6] 2 --> 3[3] 3 --> 4[4] 4 --> 5[5] 5 --> 6 6 -- 7 --> 1 25[25] --> 6 </pre>			

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Method and system for call redirection

The invention relates to a method according to the preamble of claim 1 for redirecting a call.

5

The invention also relates to a system suitable for redirecting a call.

Patent publication FI 101,663 describes a method suited for redirecting a call connected to a terminal to some other target number even after answering the call.

10

According to cited method, the terminal user (person or machine) that has answered the call hangs up shortly, goes back off hook now by calling a dialing-receiving device, dials the target number to the device thus indicating the desired target number of desired call redirection and hangs up after the entry/entries of the data required for the desired call redirection.

15

This method is hampered by the following shortcomings. The party redirecting the call must carry out a complicated sequence of actions and concentrate on the dialed number. Hence, redirection is so complicated that the operation is inconvenient to perform from any telephone set. The method requires answering to an incoming call, thus forcing the caller to pay also for the time consumed in the call redirection.

20

The technique of redirection control going on-hook and back off-hook (known for instance in the wireline network technology as the Flash function that is implemented utilizing the home register requery signal) is not possible in current mobile telephone networks without a modification of the network control software, because sending the signal "B goes on-hook" releases the connection immediately. In practice, the signal "B goes on-hook" is sent, e.g., from a mobile phone by depressing the red pushbutton of the handset keypad, whereupon no restoration of the released connection is possible.

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Further, the method described in cited publication does not permit the redirection of

a call established by the calling party, that is an outgoing call, by virtue of the disclosed method. For this purpose another approach is required and the user must learn at least two different procedures: one for linking calls established in the role of the calling party and another for redirecting an answered incoming call.

5

It is an object of the present invention to overcome the disadvantages of the above-described technique and to provide an entirely novel method and system for call redirection.

10 The goal of the invention is achieved by virtue of using in the method a communications connection not linked with the call to be redirected nor to its control connection (signaling path), said communications connection serving to transmit the call control information over a network (such as the Internet) not serving the actual call connection to a signaling server (typically a WEB server) that in turn sends the
15 information to a centralized control point (typically an SCP) of the network.

Advantageously, the invention is implemented by way of designing the redirection procedure and the technique serving the same such that the call redirection can be performed in a simple manner by means of a few functions. This goal is attained by
20 virtue of using a signaling protocol or protocols, which is/are compatible with the terminal(s) used (e.g., WAP, Wireless Application Protocol, or the like) but is not associated with the actual telephone connection, for transmitting the redirection information of the ongoing call between the terminal and the call-managing unit of the network to a control device (typically a WEB server) utilizing said information
25 that in turn sends the information to a device managing the ongoing call (typically an SCP) in a format compatible with the latter device. Furthermore, the signaling information for call control is transmitted over a communications path separate from the actual telephone communication path.

30 Accordingly, the method according to the invention concerns, for the purpose of managing a call, the use of a communications facility that operates separate from the

signaling system of a conventional public switched telephone network and transmits information over a communications path separate from the telephone connection.

5 Respectively, the system according to the invention comprises a server connected over a communications path separate from a telephone connection to at least one terminal of the system and a data base, the server being capable of communicating with said terminal using a signaling protocol different from that of the telephone connection, the server further being capable of converting the information received from said terminal into a format compatible with said data base and of converting the
10 information received from said data base into a format compatible with said terminal thus performing a protocol conversion.

15 More specifically, the method according to the invention is characterized by the specifications disclosed in the characterizing part of claim 1.

15 Furthermore, the system according to the invention is characterized by what is stated in the characterizing part of claim 9.

20 The invention offers significant benefits.

20 By virtue of the invention, it is possible to perform redirection of calls or pagers also in a situation wherein the call passes over the interfaces of two different networks (e.g., an Internet voice connection in which the call is initiated from the Internet and is passed to a conventional telephone network and vice versa). It is also
25 possible to perform the call redirection from mobile telephones or the like terminals/networks in which a normal telephone connection is released when the user goes on-hook. The system according to the invention permits the user to avail of a menu-based user interface in which call redirection is effortless.

30 In the following, the invention is described in more detail by way of exemplifying embodiments with reference to appended drawings in which

FIG. 1 is a block diagram illustrating a first embodiment of the method according to the invention; and

- 5 FIG. 2 is a block diagram illustrating a second embodiment of the method according to the invention.

10 In FIG. 1 is described a call redirection procedure after the user has answered the incoming call. The call is connected from a terminating switching office 1 of a telephone network to a terminal 2 in a conventional manner. Typically, the terminating switching office 1 is an SSP equipped with intelligent network facilities. The user of the terminal 2 answers the incoming call and, at recognizing the need for call redirection, selects from a menu 3 of his terminal 2 item "redirect call" and then item "target number for redirection". The menu 3 may contain a plurality of stored target
15 numbers or the menu 3 may be updatable either from the terminal 2 or from the network. Target number list update from a terminal occurs in a manner compatible with the terminal type using, e.g., the routines of the WAP or via text messages or the like. Using such a compatible protocol, the terminal 2 sends the information 4 selected from the menu 3 to a server 5, typically a WEB server, operating in a
20 network separate from that of the ongoing call and capable of interpreting the protocol used. The server 5 transmits the information to a network device 6 responsible for handling the request for call redirection converted into a format compatible with the network device 6 that typically is the data base of an intelligent network control point (SCP). The control point 6 sends a control message 7 in a
25 proper format, that is, now compatible with the signaling protocol used in the telephone traffic management to the switching office 1, which as a result thereof performs connection 8 of the call to the desired target 9. The control message 7 is sent immediately after the user of the terminal 2 releases the original incoming call by depressing the pushbutton that sends the "B on-hook" signal.

30

Thus, depressing the pushbutton "B on-hook" controls the terminating switching

office 1 to send a message about the call release 25 to the network control point device 6.

Accordingly, the call control procedure comprises the following steps:

5

- a) Information for call control is inputted by WAP means, for instance.
- b) The original incoming call or call attempt (by definition, call attempt refers to an incoming call not answered prior to the redirection of the call) is released.
- c) As a result of call release, the control point such as SCP redirects the call to the
10 desired target number.

Call redirection without answering the incoming call is next described with reference to the diagram of FIG. 1.

- 15 The call is first connected in a normal manner from the terminating switching office 1 (typically an SSP equipped with intelligent network facilities) of a telephone network to a terminal 2. The user of the terminal 2 decides to redirect the incoming call without answering the same due to, e.g., seeing from the displayed caller number that he has no need to answer the call on the spot. Next, the following procedure is
20 carried out.

The user selects from the menu 3 of his terminal 2 item "redirect call" and then item "target number for redirection". The menu 3 may contain a plurality of stored target numbers or the menu may be updatable either from a terminal or from the network
25 (the former taking place in a manner compatible with the terminal type using, e.g., the protocol routines of the WAP or via text messages or the like).

Using such a compatible protocol, the terminal 2 sends the information 4 selected from the menu 3 to a server 5, typically a WEB server, which can interpret the protocol and operates in a network separate from that of the ongoing call. The server 5
30 transmits the information to the network device 6, which typically the data base of an

intelligent network control point (SCP) and is responsible for handling the request for call redirection, now converted into a format compatible with said network device.

- 5 Accordingly, the server 5 is connected over a communications path to at least one database 6 and, at any time the terminal user sends control information from his terminal's menu, the telecommunications connection between the terminal and the server 5 is established using the selected signaling protocol. The server 5 is capable of communicating with the terminal 2 using a signaling protocol which is different
10 from that used for traffic management in the telecommunication network and also is capable of converting the information received from the terminal 2 into a format compatible with the data base 6 and, vice versa, is also capable of converting the information received from data base 6 into a format compatible with the terminal 2.
- 15 When the user of the terminal 2 depresses the pushbutton "B on-hook", information 25 on the event is sent over the normal signaling path of the telecommunication network from the terminating switching office 1 to the network control point device 6. On the basis of the received call release command and call redirection information earlier received via the server 5, the control point 6 generates and sends a control
20 message 7 in a proper format, that is, now compatible with the signaling protocol used for telecommunication network traffic management, to the switching office 1, which as a result thereof performs the connection 8 of the call to the desired target number 9.
- 25 If the call billing is based on the start instant of a call, as is the case in conventional telephone networks, the call charging to the caller is started not earlier than at the instant the call is answered at the new target number 9.

A method suited for linking two outgoing calls established separately is illustrated in
30 FIG. 2.

As shown in FIG. 2, a *first* call is established in a conventional manner between a terminal 11 and a terminating switching office 12 of a telecommunication network. Typically, the terminating switching office 12 is an SSP equipped with intelligent network facilities. The call is routed to the dialed number having a B-subscriber terminal 20 connected thereto.

When the user of the terminal device 11 decides to make another call, he selects from a menu 13 of his terminal item "redirect call" and then item "target number for redirection". The menu 13 may contain a plurality of stored target numbers or the menu may be updatable either from the terminal or from the network. Target number list update from a terminal occurs in a manner compatible with the terminal 11 using, e.g., the protocol routines of the WAP or via text messages or the like.

Using such a compatible protocol, the terminal 11 sends the information 14 selected from the menu 13 to a server 15 of the network, which can interpret the protocol and operates in a network separate from that of the ongoing call. Typically, the server 15 is a WEB server that transmits the information to the network device 16 responsible for handling the request for call redirection. The network device is typically the data base of an intelligent network control point (SCP).

The control point 16 sends a control message 17 in a proper format, that is, now compatible with the used signaling protocol to the switching office 12, which as a result thereof performs the connection 18 of the call to the *second* desired target number 19, thus establishing another call.

After the call to the second target number 19 is established, information on the event is sent to the network device 16 responsible for handling the request for call redirection using in the signaling a protocol 21 that is compatible with the normal signaling of telephone network traffic.

Upon receiving the information 21 "Call established" (actually meaning "Target

numbers received”), “Call set-up” or the like control message, the network device 16 performs the following steps.

5 The information 22 indicating the that the call has been established is transmitted to a server 15 not associated with the actual telephone connection, whereupon the server 15 sends with help of the used signaling protocol the information further, e.g., to the menu 13 of the terminal 11, wherefrom the user of the terminal 11 can verify the call to be established. This kind of information can be displayed graphically, e.g., as text “Connected” or via some other kind of visual “annunciation
10 symbol”. Alternatively, the information may be conveyed by a signal tone or musical tune emitted by the terminal. Subsequently, the network device 16 sends a control message or messages 23 to the terminating switching office 12, whereupon the switching office releases the connection between the switching office 12 and the terminal 11 wherefrom the linking of the two calls was performed and establishes a
15 connection between the terminal 20 of the first called number and the terminal 19 of second called number.

Without departing from the spirit of the invention, the target number selection may be performed freely instead of using a menu for the selection.

20

If the menu information stored in the user terminal is updated from the network data base, the user may be provided with a facility of updating the information stored in the network facilities over, e.g., an Internet connection, whereby obviously normal data transfer authorization measures must be arranged.

25

What is claimed is:

1. Method for redirecting a call, e.g., in conjunction with a call rerouting, in which method calls are established at least partially over a public switched telephone
5 network (1, 6, 16, 12) using the signaling protocol of the public switched telephone network,

c h a r a c t e r i z e d i n t h a t

- 10 - during the ongoing call, signaling information (14) is received at and sent from the terminal (2, 11) over a communications path separate from that serving the actual telephone connection using a signaling protocol which is different from that used for call management in a public switched telephone network, said information containing data suitable for controlling the actual
15 telephone connection, and

- the signaling which is different from that used for call management in a public switched telephone network is converted into a normal telephone call control signaling and then is sent to the means of the public switched
20 telephone network for the purpose of controlling the ongoing call.

2. Method according to claim 1, c h a r a c t e r i z e d i n t h a t the signaling which is different from that used for call management in a public switched telephone network is utilized for the purpose of controlling a redirection of the ongoing call.
25

3. Method according to claim 1, c h a r a c t e r i z e d i n t h a t the redirection target (directory number, IP address or the like) is transmitted using a protocol or protocols which are conventionally used in terminals (such as WAP, text messages sent over SMS and others of the kind) but are not associated with conventional call control
30 signaling.

4. Method according to claim 1, characterized in that the user is provided with a menu-based user interface for the purpose of selecting the desired call control information that will be transmitted over said parallel communications channel using a parallel signaling protocol.

5

5. Method according to claim 4, characterized in that the menu-based user interface provided to the user is arranged to contain the most pertinent target connection information and a facility of using an entirely freely selectable target directory number or address.

10

6. Method according to claim 4 or 5, characterized in that the information displayed by the menu is arranged to be storable/updatable from the means responsible for the telephone network call management (such as an intelligent network control point, SCP, a short-message service center, etc.).

15

7. Method according to claim 6, characterized in that the information update of the telephone network control menu is allowed to take place over an Internet connection or the like communications network thus permitting the user to avail of his Internet connection for updating his current list of redirection target numbers and the like data, whereby such information is transmitted to the user terminal for use therein as the control menu information by means of a signaling protocol (such as WAP) compatible with the user terminal.

20

8. Method according to claim 4 or 5, characterized in that a facility is provided for the entry/update of the control menu information from the user terminal's internal user interface (such as a telephone set keypad, computer keyboard, mouse, and the like).

25

9. System for redirecting a call, e.g., in conjunction with a call rerouting, in which system calls are established at least partially over a public switched telephone network (1, 6, 16, 12) using the signaling protocol of the public switched telephone

30

network, said system comprising at least

- a terminating switching office (1),
- a data base communicating with the terminating switching office (1), and
- 5 - at least two terminals (2, 9) capable of supporting conventional telephone communications over the conventional telephone communications connections of said system,

c h a r a c t e r i z e d in that the

10

- the system includes a server (5) that communicate over a communications connection (4), which is separate from said telephone communications connection, with at least one terminal (2) of the system as well as over a communications connection with said data base (6), and

15

- the server (5) is capable of communicating with said terminal (2) using a signaling protocol different from that of the telephone connection and further is capable of converting the information received from said terminal (2) into a format compatible with said data base (6) and of converting the information
- 20 received from said data base (6) into a format compatible with said terminal (2).

20

10. System according to claim 9, c h a r a c t e r i z e d in that the information transmitted via said server (5) is control information for call redirection.

25

11. System according to claim 9, c h a r a c t e r i z e d in that the protocol used for information transmission from said server (5) toward said terminal (2) is selected, e.g., from the protocol group comprising WAP, the text message protocol of SMS and others of the kind.

30

12. System according to claim 9, c h a r a c t e r i z e d in that said terminal (2) has

a menu-based (3) user interface for selecting said call redirection information for being forwarded over said parallel communications path using said parallel signaling protocol.

- 5 13. System according to claim 12, c h a r a c t e r i z e d in that said menu-based (3) user interface of said terminal (2) provides at least the most pertinent call information and a facility of an entirely freely selectable call redirection target number/address.
- 10 14. System according to claim 12 or 13, c h a r a c t e r i z e d in that a facility is provided for the entry/update of said menu information as to that part of its content which is related to call management in the telephone network (intelligent network SCP, short-message service center, Internet server and the like).
- 15 15. System according to claim 14, c h a r a c t e r i z e d in that a facility is provided for the update of said menu information as to that part of its content which is related to call management in the telephone network over an Internet connection or the like communications network thus making it possible for the user to utilize his Internet connection for updating the call redirection target numbers and other
- 20 information of his choice, whereby said information is transmitted using a signaling protocol (e.g., WAP) compatible with that of his terminal to the terminal for use therein as the call control information selectable from the menu.
- 25 16. System according to claim 12 or 13, c h a r a c t e r i z e d in that a facility is provided for the entry/update of the control menu information from the user terminal's internal user interface (such as a telephone set keypad, computer keyboard, mouse, and the like).

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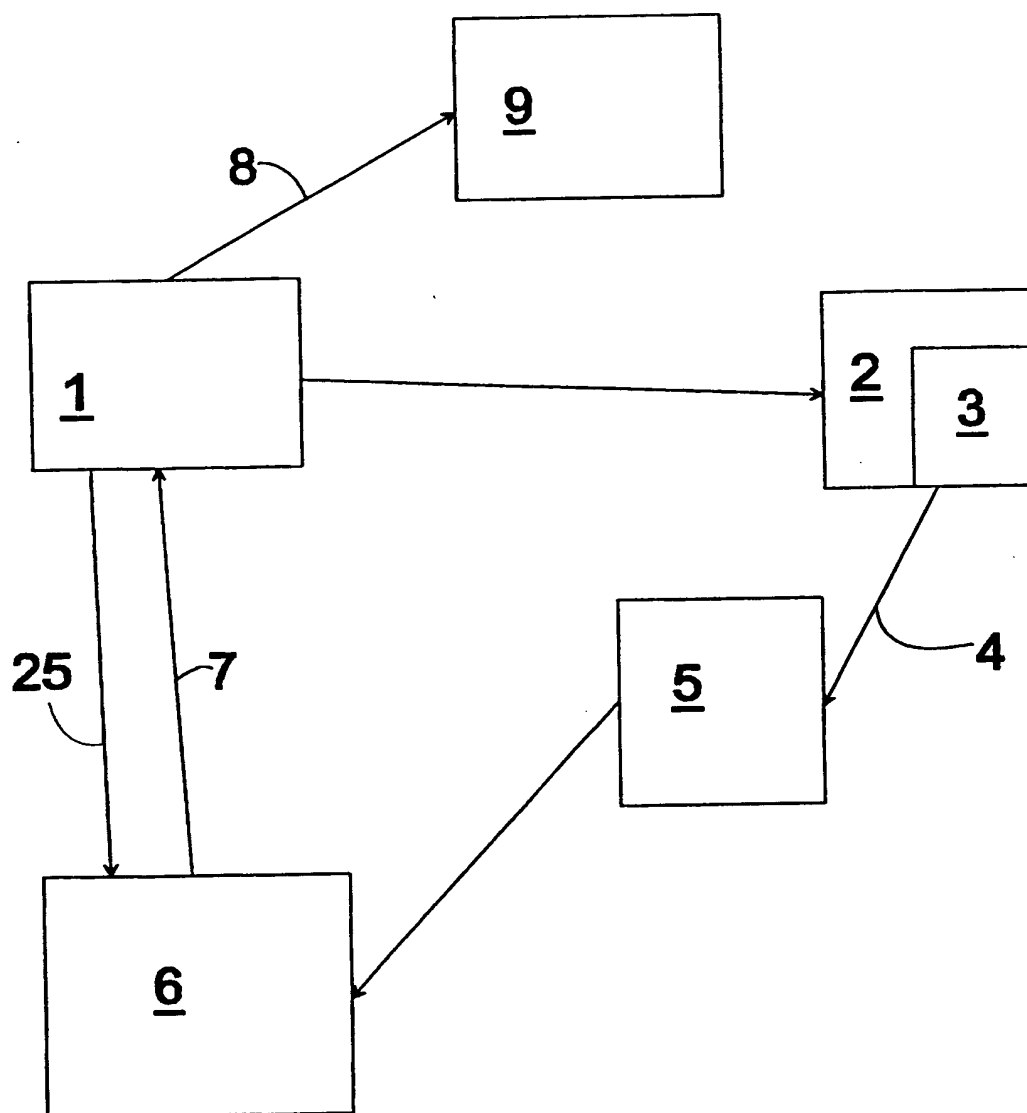


Fig. 1

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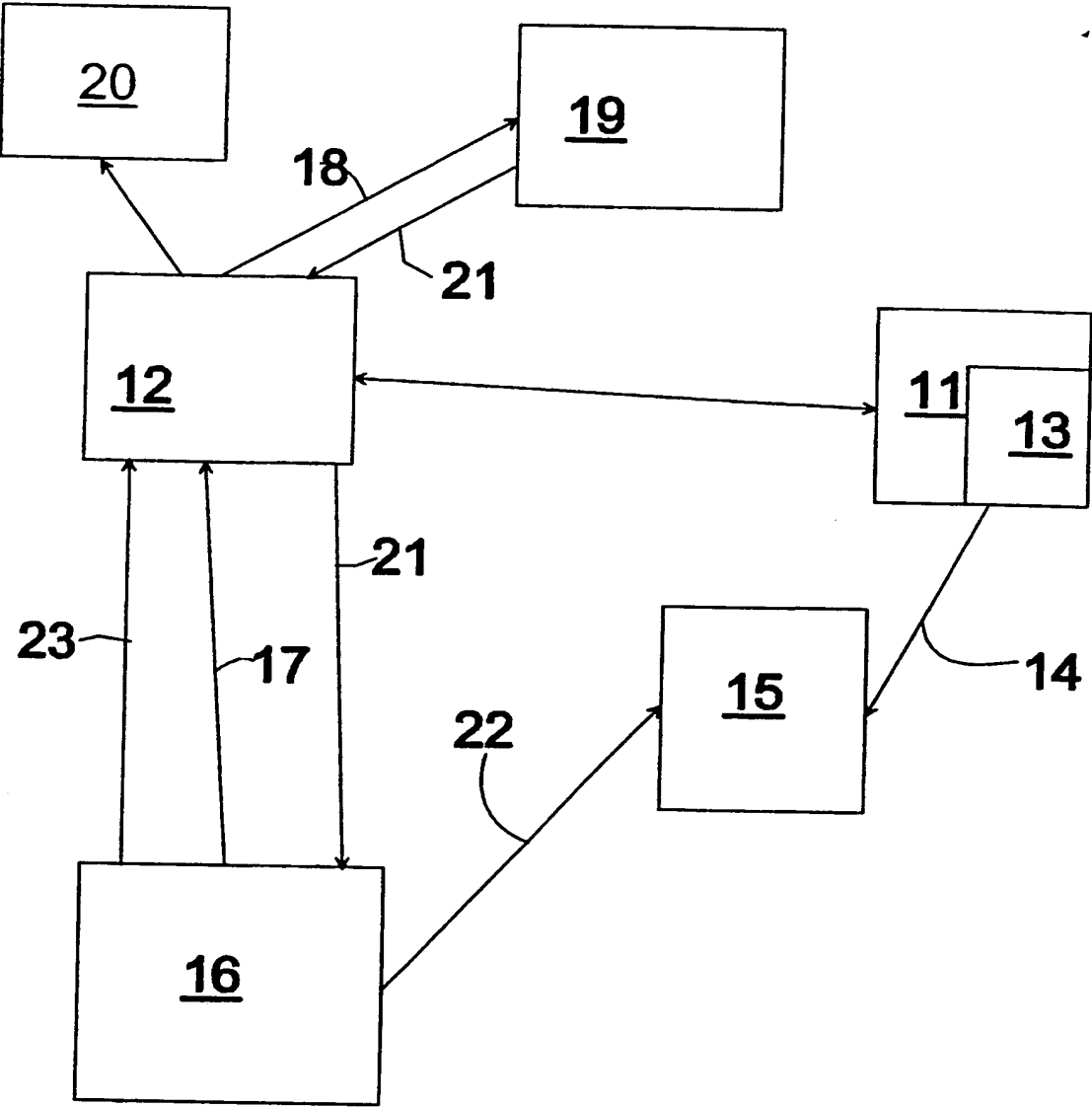


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 00/00351

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/38, H04M 3/54

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9818269 A1 (TELEFONAKTIEBOLAGET LM ERICSSON), 30 April 1998 (30.04.98), page 6, line 1 - page 7, line 8, abstract --	1-16
A	WO 9750224 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 31 December 1997 (31.12.97), page 4, line 31 - page 5, line 11, abstract -- -----	1-16

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Further documents are listed in the continuation of Box C.

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See patent family annex.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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Patent document cited in search report			Publication date	Patent family member(s)		Publication date
WO	9818269	A1	30/04/98	AU	4797397 A	15/05/98
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